



Stock Return Indices and Macroeconomic Factors: Evidence from Borsa Istanbul

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Keywords

Stock Return Indices,
Macroeconomic Factors,
Ordinary Least Square
Method.

Jel Classification

G12.

Abstract

This study analyses the relationship between oil prices, interest rates, exchange rates, industrial production and world equity index on four main sectors return indices (BIST National Industry Sector Return Index, BIST National Service Sector Return Index, BIST National Financial Sector Index and BIST National Technology Sector Index) over the period of 2000:8-2008:11 in Turkey. Interest rates and exchange rates have negative effect on all of the sectors. World equity return index has positive effect on all of the sector returns except for the technology sector. Although the industrial production index doesn't have a significant impact on Industry and Technology Sector Return Indices, it affects BIST National Service Sector Return Index and BIST National Technology Sector Index negatively. Oil prices do not have a significant effect on return indices. The results are expected to be beneficial for the potential investors and policymakers.

1. Introduction

Pricing the capital assets is one of the most important issues in finance. The Capital Asset Pricing Model (CAPM) explains the expected return on an asset above the risk free rate with the return of the market portfolio and the assets sensitivity to non-diversifiable risk called Beta. CAPM is a single factor model which is based on restrictive assumptions. The unique role of the market in explaining the returns and the models ability to explain asset returns was criticized in several studies (Kraus and Litzenberger, 1976; Basu, 1977; Fama and French, 1992). Additionally the application of CAPM is difficult, hence alternative approaches has emerged. In 1976 Ross, introduced an alternative theory to CAPM which is called Arbitrage Pricing Theory (APT). APT allows more than just one generating factor but does not specify which factors should be used in empirical studies. The factors are derived statistically. The explanatory variables in APT employ the unexpected components (Bilson, Braisford, Hooper, 2001). In their original paper, Roll and Ross (1980) suggested further research for the identification of meaningful economic factors that are proxied by the factors in APT. The first study related with this issue was conducted by Chen, Roll and Ross (1986). In their study Chen, Roll and Ross (1986) have hypothesized and tested specific macroeconomic factors as proxies for undefined variables in the APT. Since the return on a stock is determined by future cash flows and the discount rate, the macroeconomic factors that affect the future cash flows (eg. Inflation, real production, oil price, consumption etc.) and/or discount rates (interest rate, term structure, risk premium) would directly affect the stock returns. The main disadvantage of this macroeconomic factor model is that there is no theoretical basis for the selection of the macroeconomic variables.

This study investigates the relation between five explanatory variables namely; oil prices, interest rates, exchange rates, industrial production, world equity index and return indices of four national indices (BIST National Industry Sector Return Index, BIST National Service Sector Return Index, BIST National Financial Sector Return Index and BIST National Technology Sector Return Index) in Borsa Istanbul using Ordinary Least Squares Method over the period of 2000-2008. The relationship between macroeconomic variables and stock returns are largely investigated in developed countries. The number of the studies in developing countries are also increasing. But, since every country and stock market has its own peculiar characteristics, the results of the studies cannot be generalized. Testing the relationship in different settings, with different macroeconomic

variables and with different methodologies enable international investors as well as local investors to make efficient investment decisions. Additionally it will shed light to the policy makers to make more effective decisions related with the development of their stock markets.

Most of the studies regarding to the relationship between macroeconomic factors and stock returns analyse the impact of macroeconomic factors on composite stock indices rather than analyzing the impact on sector indices. But as stated by Chen, Roll and Ross (1986) the effect of the macroeconomic variables on returns may depend on the sector that the firm belongs. Therefore, in this study the analysis is conducted using four national indices.

This study aims to find the answer of whether the return of the stock market indices be explained significantly by the stated macroeconomic variables. Additionally, using four national indices returns, the differences in extent to which the macroeconomic factors affect the various indices will be determined.

This paper is organized as follows. Following part explains the stock market and relationship between macroeconomic factors and stock returns, third part is the literature review, fourth part describes data and methodology, fifth part provides the results and the last part presents conclusion.

2. The Turkish Stock Market and The Relationship Between Macroeconomic Factors and Stock Returns

Borsa Istanbul began its operations in 1986. Although the number of companies and total market capitalization was increasing, total value traded was quite low until the years of 1999-2000. The number of companies which was 80 in the year of 1986 rose to 315 until the year of 2000 but there was not a considerable increase in the number the companies from there on. In the period of 2002-2007 total value traded followed a rising trend mostly due to the high amount of foreign capital inflows. Total Value traded was 387 billion TL in the year of 2007 which is approximately %45 of Turkish GDP and total capitalization was 335.948 million TL which was %59 of GDP (CMB, 2007). To fulfill the needs of the market, many reforms were made that are in line with European Union Standards after the year of 2000. The studies also reveal that Turkish stock market is integrated with the global markets (Mandacı, 2006, Berument, Denaux, Yalçın, 2011).

After a brief overview of the Turkish Stock Market, the expected relationship between the selected macroeconomic variables and the stock returns are as follows.

The selection of macroeconomic variables is based on theoretical propositions and the results of the existing empirical studies.

2.1. Stock Prices and Foreign Exchange Rate

For an export oriented economy, currency depreciation is expected to have a positive impact on the stock market because domestic firms become more competitive. But depreciation in the value of national currency will also increase import costs. At the same time currency depreciation can also deteriorate the balance sheets by increasing the value of debt stated in foreign currency, which would cause to a deterioration in the financial positions of the firms (Aghion, Bachetta and Banerjee, 2001; Bleakley and Cowan, 2002). For an import oriented economy like Turkey; depreciation of Turkish Lira is expected to have a negative impact on stock returns due to a rise in input costs and lower profits, also due to a high foreign currency debt in their liabilities.

2.2. Stock Prices and Interest Rates:

Expected relationship between interest rates and stock prices is negative since a rise in interest rates increase the opportunity cost of investing in equities (Orman, 2003). Another reason of the negative relationship is the decline in profits and dividends due to rising interest expenses. Also according to the Discounted Cash Flow model; rising interest rates would cause to an increase in discount factor of cash flows.

2.3. Stock Prices and Industrial Production:

Changes in Industrial Production index is considered as an indicator that reflects similar changes in overall economic activity. An increase in industrial production would raise the expected future cash flows and the profitability of the firms. So the relationship between industrial production and stock returns is expected to be positive.

2.4. Stock Prices and Oil Prices:

The expected relationship between oil prices and stock prices is negative since an increase in oil price will increase the production costs and input costs of the firms causing to a decline in profits and cash flows (Mahmood, Dinniah, 2009). According to the reports of Energy Information Administration, Turkey is a net oil importer country and the level of the gap between consumption and production has shown a rising trend over the analyzed period. Therefore, a negative relationship between oil prices and stock returns is expected.

2.5. Stock Prices and the World Equity Index:

Jong and Roon (2001) revealed that the level of integration of emerging capital markets with the world markets have a strong effect on the expected stock returns in emerging markets (Jong and Roon, 2001). In a most recent study; Korkmaz and Çelik (2009) found that Turkish equity market has a cointegration relationship with sixteen developed and twenty one developing markets. In light of these findings, it is expected that both local and global factors may play a role in the determination of equity returns. The sign of the relationship is expected to be positive. At the same time, the level of significance of the World Equity index factor may also be a sign of a country's integration level (Bilson, Brailsford and Hooper, 2001).

3. Literature Review¹

Gan, Lee, Yong and Zang (2006) analysed the relationship between seven macroeconomic variables and New Zealand Stock Index over the period of 1990-2003 using cointegration analysis. As a result of the study it was found that New Zealand Stock Index is determined by interest rate, money supply and real GDP. The authors couldn't find any evidence showing that stock index is a leading indicator of macroeconomic variables.

For US and Japan Humpe and MacMillan (2007) conducted an analysis covering the period of 1965-2005. Using cointegration analysis it is found that in US, stock prices are positively related to industrial production and negatively related to consumer price index. In Japan stock prices are positively influenced by industrial production index and negatively influenced by money supply, one interesting point for Japan is that the Industrial Production is negatively influenced by consumer price index and long term interest rates.

Mahmood and Dinniah (2007) investigated the dynamic relationship between stock prices and inflation rate, industrial production index and foreign exchange in Malaysia, Korea, Thailand, Hong Kong, Japan and Australia over 1993-2002 period using monthly/quarterly data. According to the results of Engle Granger test and Johansen and Jesuslus maximum like hood procedure; they provided evidence to the long run relationship between the stock price and macroeconomic variables. But based on the results of Error Correction Model (ECM), they found that there is no cointegration in the

¹ There is an extensive literature related with the topic, hence, more recent studies are explained in this part.

short run relation between all variables in all selected countries except for Hong Kong (foreign exchange and stock price) and Thailand (Real output and stock price).

Gay (2008) examines the time series relationship between stock market indices prices and the macroeconomic variables of exchange rate and oil prices for Brazil, Russia, India and China using monthly data for the period of 1999-2006 by employing the Box-Jenkins Arima Model. The effects of exchange rate and oil prices on stock market indices are found to be insignificant. The relationship between past and present stock market returns is also found to be insignificant.

In a study that investigates the relationship between oil price and industry stock returns in Indonesia; Agusman and Deriantino (2008) found that in general oil price changes do not have a significant impact on stock returns. Ordinary least squares estimation technique is used over the 1996-2008 period. It is also revealed that Indonesian government liberalization policy on oil prices in 2005, has a positive impact on mining and negative impact on the trading sectors.

For Russia, China and Japan, Wang (2010) investigated the dynamic relationship between oil price, stock price and real economic activity over the 1999-2008 period using VAR analysis and found a long run equilibrium relationship among these variables only in Russia. Another conclusion is that, stock price and oil price have significant impact on economic activity in the short run in Russia.

Laopodis (2011) conducted an analysis for pre and post Euro periods in France, Germany, Italy, UK and US over 1990-2009 using the rolling-sample cointegration technique and VAR specifications. As a result it is found that different countries stock indices gave different responses to a change in economic fundamentals especially in post Euro period.

In Turkey; Sari and Soytaş (2006) utilize generalized forecast error variance decomposition and generalized impulse response technique to examine the relationship between stock returns, crude oil prices, interest rates and output in Turkey. Using monthly data over the period of 1987-2004 it is found that oil price shocks do not have any significant effect on real stock returns in Turkey while industrial production has the lowest impact and interest rates have considerable impact on stock returns. Kasman and Kasman (2008) investigates the long run relationship between stock prices in Turkey and inflation, industrial production, money supply (m1) and exchange rates over the period of 1986-2003. Using cointegration test; they showed that an increase in industrial

production cause to an increase in stock prices in the long run. Inflation and money supply have negative, exchange rates have positive relationship with stock prices. Also using Vector Error Correction model they found that except for industrial production macroeconomic variables cause and are caused by stock prices. Kandir (2008) analyzed the relationship between stock portfolio returns and seven macroeconomic factors over the 1997-2005 period. These factors are; the growth rate of industrial production index, change in consumer price index, growth rate of narrowly defined money supply, change in exchange rate, interest rate, growth rate of international crude oil price and return on the MCSI world equity index. Utilizing a multiple regression model it is revealed that exchange rate and world market return positively affect the portfolio returns and interest rate has a negative effect on returns while (except for inflation) other factors do not show any significant effect on portfolio returns. Tursoy, Gunsul and Rjoub (2008) use ordinary least square technique in order to test the Arbitrage Pricing Theory for the period of 2001 up to 2005 in Istanbul Stock Exchange (BIST). The effects of thirteen macroeconomic factors namely; money supply, industrial production, crude oil price, consumer price index, import, export, gold price, exchange rate, interest rate, gross domestic product, foreign reserve, unemployment rate and market pressure index; on 11 portfolios which is constructed by using the subsectors of industry sector are determined. The number of factors used in each regression differs between portfolios. As a result they conclude that macroeconomic variables do not have a strong explanatory power on stock returns and the sign of the relationship between the macroeconomic factors and portfolio returns change one portfolio to another. Bolak and Süer (2009) investigate the effect of exchange rates, the interest rates and oil prices on Istanbul Stock Exchange National 100 (BIST 100) index using monthly data from 2002 to 2009. Employing least squares estimation they found that although an important portion of the variation in the monthly return of BIST 100 index is not fully predicted with the used independent variables there is a significant negative relationship between the BIST 100 index and the first lag of the monthly return of BIST national 100 indices, the exchange rate, interest rate. Özer, Kaya and Özer (2011) found a significant relationship among the macroeconomic variables (Consumer price index, interest rates, money supply, trade balance, production index) and stock prices using ordinary least squares method. Additionally Johansen test results show that there exists a long run relationship between stock prices, consumer price index, interest rates, money supply, trade balance and production index. According to the results

of Granger causality analysis there is a unidirectional relationship from stock prices to consumer price index, interest rates and trade balance and also there is again a unidirectional relationship from gold prices, money supply and production indices to stock prices.

4. Data and Methodology

Monthly data over the period of 2000:8- 2008:11 are analyzed in this study using Ordinary Least Squares (OLS) method. Macroeconomic factors data are gathered from the International Financial Statistics (IFS) and Global Financial Data databases. All of the return indices are obtained from Borsa İstanbul (BIST). The source of the oil prices (West Texas Intermediate Spot Prices) is Energy Information Administration. Morgan Stanley Capital International's World Equity index is used as a global factor in the study. Daily data for return indices are turned in to monthly data by taking the simple averages. Definitions of the variables are given in Table 1.

Table 1: Variable Definition

| Variable | Proxy | Data Source | Description |
|--------------------------------|-------|-------------|---|
| Oil Prices | OIL | (EIA) | $LN(\text{Oil Price}_t / \text{Oil Price}_{t-1})$ |
| Interest Rates | RRX | (GFD) | 1 Month Real Deposit Interest Rate |
| Exchange Rate | EXC | (IFS) | $LN(\text{USD-TL}_t / \text{USD}_{t-1})$ |
| Industrial Production | DIPSA | (IFS) | $(IP_t - IP_{t-1}) / IP_{t-1}$ |
| World Equity Index | WORLD | (MSCI) | $LN(\text{World W}_t / \text{World}_{t-1})$ |
| Industrial Sector Return Index | Y1 | (BIST) | $LN(Y_{1t} / Y_{1t-1})$ |
| Service Sector Return Index | Y2 | (BIST) | $LN(Y_{2t} / Y_{2t-1})$ |
| Financial Sector Return Index | Y3 | (BIST) | $LN(Y_{3t} / Y_{3t-1})$ |
| Technology Sector Return Index | Y4 | (BIST) | $LN(Y_{4t} / Y_{4t-1})$ |

Model that is used in the study is a multifactor model which is stated as follows:

$$Y_{it} = \beta_0 + \beta_{1t}OIL_{it} + \beta_{2t}RRX_{it} + \beta_{3t}EXC_{it} + \beta_{4t}DIPSA_{it} + \beta_{5t}WORLD_{it} + e_{it}$$

Y_{it} is the return on index i at time t (i :1,2,3,4),

e_{it} is the residual error of the regression

5. Results

Ordinary Least Squares (OLS) is employed in this study in order to determine the effects of the described factors on the stock returns of four indices. The existence of unit root is examined by using Augmented Dickey- Fuller (ADF) tests (Table 2). Industrial Production data is adjusted for seasonality by TRAMO/SEATS method. E-Views 9.5 statistical software package is used for performing the tests in this study.

Table 2: Results of Augmented Unit Root Tests

| | Y1 | Y2 | Y3 | Y4 | OIL | RRX | EXC | DIPSA | WORLD |
|-----------------------|--------|--------|--------|---------|--------|--------|--------|--------|--------|
| Test for Unit Root in | Level | Level | Level | Level | Level | Level | Level | Level | Level |
| ADF Test Statistics | -8.088 | -8.530 | -9.265 | -8.2511 | -6.549 | -6.689 | -5.981 | -3.992 | -6.448 |
| %1 Critical Value | -3.498 | -3.498 | -3.498 | -3.4977 | -3.498 | -3.498 | -3.498 | -3.498 | -3.498 |
| %5 Critical Value | -2.891 | -2.891 | -2.891 | -2.891 | -2.891 | -2.891 | -2.891 | -2.891 | -2.891 |
| %10 Critical Value | -2.583 | -2.583 | -2.583 | -2.583 | -2.583 | -2.583 | -2.583 | -2.583 | -2.583 |

As it can be seen in Table 2, since the null hypothesis of a unit root is rejected at all levels, it can be said that the series do not contain unit root.

To check whether there is autocorrelation and/ora heteroscedasticity problems, Breusch-Godfrey Serial Correlation LM Test and White Tests were conducted², respectively. In the first model where the dependent variable is the industrial return index (Y1), Breusch-Godfrey Serial Correlation LM Test results do not show autocorrelation but White Test results show that heteroscedasticity exist, so the model is re-estimated using White's standard-consistent errors.

²The results of these test may be provided if it is required.

Table 3: Results of Regression Analysis-Industry Sector Return Index

| Dependent Variable: Y1 | | | | |
|------------------------|-------------|-----------------------|-------------|-----------|
| Variable | Coefficient | Std. Error | t-statistic | Prob. |
| C | 0.051357 | 0.013822 | 3.715695 | 0.0003 |
| OIL | 0.094577 | 0.121632 | 0.777573 | 0.4388 |
| RRX | -2.548772 | 0.953266 | -2.673725 | 0.0088 |
| EXC | -0.406342 | 0.232233 | -1.749717 | 0.0834 |
| DIPSA | -0.372924 | 0.276371 | -1.349358 | 0.1805 |
| WORLD | 0.562276 | 0.235563 | 2.386947 | 0.0190 |
| R-squared | 0.330740 | Mean dependent var | | 0.009339 |
| Adjusted R-squared | 0.295141 | S.D. dependent var | | 0.089954 |
| S.E. of regression | 0.075522 | Akaike info criterion | | -2.270660 |
| Sum squared resid | 0.536136 | Schwarz criterion | | -2.114350 |
| Log likelihood | 119.5330 | Hannan-Quinn criter. | | -2.207398 |
| F-statistic | 9.290736 | Durbin-Watson stat | | 1.878158 |
| Prob(F-statistic) | 0.000000 | Wald F-statistic | | 5.271240 |
| Prob(Wald F-statistic) | 0.000260 | | | |

Table 3 shows that real interest rates and exchange rates have negative effect and world equity index has a positive impact on Industry Sector Return Index. The results are significant at %1, %10 and %1 significance level accordingly. Although the explanatory power of the overall results is low (%30), except for oil and industrial production the results are in line with the expectations.

Table 4 shows the regression results of service sector return index. Breusch-Godfrey Serial Correlation LM Test shows no autocorrelation and White Tests show no heteroscedasticity. As to the results of the OLS, real interest rates and exchange rates have negative effect at %1 significance level whereas world equity index has positive effect on Service Sector Return at %5 significance level. Although the results are similar to Industry Sector Return Index, industrial production negatively affects the Service Sector Return Index. The explanatory power of this model is %33.

Table 4: Results of Regression Analysis- Service Sector Return Index

| Dependent Variable: Y2 | | | | |
|------------------------|-------------|-----------------------|-------------|-----------|
| Variable | Coefficient | Std. Error | t-statistic | Prob. |
| C | 0.055944 | 0.011504 | 4.863164 | 0.0000 |
| OIL | -0.122294 | 0.090717 | -1.348081 | 0.1809 |
| RRX | -2.827247 | 0.617978 | -4.574996 | 0.0000 |
| EXC | -0.602828 | 0.166088 | -3.629578 | 0.0005 |
| DIPSA | -0.504296 | 0.254211 | -1.983774 | 0.0502 |
| WORLD | 0.442331 | 0.201289 | 2.197489 | 0.0304 |
| R-squared | 0.359516 | Mean dependent var | | 0.006584 |
| Adjusted R-squared | 0.325448 | S.D. dependent var | | 0.087476 |
| S.E. of regression | 0.071845 | Akaike info criterion | | -2.370488 |
| Sum squared resid | 0.485199 | Schwarz criterion | | -2.214178 |
| Log likelihood | 124.5244 | Hannan-Quinn criter. | | -2.307227 |
| F-statistic | 10.55280 | Durbin-Watson stat | | 1.862076 |
| Prob(F-statistic) | 0.000000 | | | |

For the Financial Sector Return index White Test results proves that there is heteroscedasticity problem. So the model is re-estimated using White's standard-consistent errors. The sign of the relationship is negative for real interest rates and exchange rate but for the world equity index the sign of the relationship is positive as it can be seen in Table 5. The results are significant at %1 significance level. Similar to Industry Sector Return Index no statistically significant results could be found for oil and industrial production. Adjusted R^2 of the model is %34.

Table 5: Results of Regression Analysis- Financial Sector Return Index

| Dependent Variable: Y3 | | | | |
|------------------------|-------------|-----------------------|-------------|-----------|
| Variable | Coefficient | Std. Error | t-statistic | Prob. |
| C | 0.055247 | 0.017604 | 3.138328 | 0.0023 |
| OIL | 0.022685 | 0.131196 | 0.172908 | 0.8631 |
| RRX | -2.655646 | 1.060595 | -2.503921 | 0.0140 |
| EXC | -0.816010 | 0.323678 | -2.521051 | 0.0134 |
| DIPSA | -0.319531 | 0.311924 | -1.024388 | 0.3083 |
| WORLD | 0.691598 | 0.272138 | 2.541354 | 0.0127 |
| R-squared | 0.377002 | Mean dependent var | | 0.007280 |
| Adjusted R-squared | 0.343864 | S.D. dependent var | | 0.116699 |
| S.E. of regression | 0.094529 | Akaike info criterion | | -1.821702 |
| Sum squared resid | 0.839953 | Schwarz criterion | | -1.665392 |
| Log likelihood | 97.08510 | Hannan-Quinn criter. | | -1.758441 |

| | | | |
|------------------------|----------|--------------------|----------|
| F-statistic | 11.37668 | Durbin-Watson stat | 1.932262 |
| Prob(F-statistic) | 0.000000 | Wald F-statistic | 9.633399 |
| Prob(Wald F-statistic) | 0.000000 | | |

For the model that where Technology Sector Return Index as dependent variable; Breusch-Godfrey Serial Correlation LM Test shows autocorrelation. So the model is re-estimated using Newey- West standard errors. overall explanatory power of the model is %32 and similar to the results of other sectors, real interest rate and exchange rate negatively affect Technology Sector Return Index. The results are significant at %1 significance level. Similar to the Service sector index the effect of industrial production on Technology Sector Return Index is negative.

Table 6: Results of Regression Analysis- Technology Sector Return Index

| Dependent Variable: Y4 | | | | |
|------------------------|-------------|-----------------------|-------------|-----------|
| Variable | Coefficient | Std. Error | t-statistic | Prob. |
| C | 0.052100 | 0.016865 | 3.089231 | 0.0026 |
| OIL | 0.087048 | 0.149517 | 0.582197 | 0.5618 |
| RRX | -3.681161 | 0.920614 | -3.998596 | 0.0001 |
| EXC | -0.954488 | 0.301849 | -3.162133 | 0.0021 |
| DIPSA | -0.773869 | 0.303467 | -2.550092 | 0.0124 |
| WORLD | 0.136852 | 0.332301 | 0.411832 | 0.6814 |
| R-squared | 0.350816 | Mean dependent var | | -0.011100 |
| Adjusted R-squared | 0.316285 | S.D. dependent var | | 0.115684 |
| S.E. of regression | 0.095656 | Akaike info criterion | | -1.797999 |
| Sum squared resid | 0.860100 | Schwarz criterion | | -1.641689 |
| Log likelihood | 95.89997 | Hannan-Quinn criter. | | -1.734738 |
| F-statistic | 10.15942 | Durbin-Watson stat | | 1.591992 |
| Prob(F-statistic) | 0.000000 | Wald F-statistic | | 16.66366 |
| Prob(Wald F-statistic) | 0.000000 | | | |

According to the results of the study although the explanatory power of the models are low (% 33 on the average). Real interest rates and exchange rate have significant effect on all of the indices. Real interest rates have negative impact on all of the four indices as expected. The highest coefficient belongs to the technology sector (-3.68) and the lowest belongs to the industry sector (-2.55). When interest rates are high, investors prefer to invest in bank or bonds as alternative investment strategies. Exchange rate and stock return indices relationship is also negative as predicted in the study. Again the most

affected sector from change in exchange rate is the technology sector with a coefficient of -0.93. Technology sector is followed in turn by Finance (-0.81), Service (-0.60) and Industry Sectors (-0.41). The results for interest rates and exchange rates are in line with the results of Bolak and Sürer (2009). As it is stated in the literature review Kasman and Kasman (2008) and Kandir (2008) found a positive relationship between exchange rates and stock returns. It is thought that the time period that is covered in the analysis change the results. Since Turkey is an import oriented economy and the foreign currency debt ratios of the firms are high, this result is not surprising. As in line with Kandir (2008), World equity index has a significant positive impact on the Industry, finance and service indices with the coefficients of 0.56, 0.69 and 0.44, respectively. That means global factors has an important effect on the stock returns in these sectors. Consistent with other studies (Sarı and Soytaş 2006, Agusman and Deriantino 2008, Bolak and Sürer 2008, Gay 2008, Wang 2010) one of a surprising result is the insignificant relationship between oil price and returns. Another interesting result is the effect of industrial production on stock index returns, although industrial production does not have a significant effect on Industry and Finance sector return index, the effect on Service and Technology sector returns are negative and significant. This may be due to selection of the proxy for industrial production index. Following the literature the analysis was conducted by utilizing the growth rates but not the levels.

6. Conclusion

This study aims to investigate the relationship among oil prices, interest rates, exchange rates, industrial production, world equity index and Borsa Istanbul national sector indices. Although the variation in sector return indices cannot fully predicted with the models that are utilized in the study; it can be said that Industry Sector Return Index, Service Sector Index, Technology Sector Return Index and Financial Sector return index are negatively affected from a rise in exchange rates and interest rates. Since, Turkish economy is import oriented and the foreign currency liabilities of Turkish firms are high, most probably a rise in foreign currency negatively affects the values of the firms. The highest coefficient belongs to technology sector. Technology sector is followed in turn by Finance, Service and Industry Sectors. The negative effect of interest rates on return indices is also an expected result, when interest rates are high investors prefer to invest in other financial instruments rather than investing in stock exchanges. Again the technology sector is the most affected sector from the change in interest rates and it is

followed by service, finance and industry sectors, respectively. The positive relationship between world index and Industry, service and finance indices are thought to be due to increasing integration of Borsa Istanbul with the global markets. The integration has the highest effect on financial sector. As in line with the other studies in the literature no significant results are found for oil prices. Although Turkey is a net oil importer country oil prices are expected to have a significant effect especially on the Industry Sector Index. In contrast with the expectations industrial production doesn't have any significant effect on Industry Sector Index while having a negative effect on Service and Technology sector indices. This result may be due to the fact that, similar to the other studies in the literature industrial production variable represent the growth rate in production. Taking the levels would probably change the results, it would be appropriate to use co-integration analysis in further research. The macroeconomic variables (except for oil) have significant effect on sector indices. Therefore, in order to develop the stock markets, the policy makers in the economy would bear in mind the potential effects of their decisions on the stock markets. These results should be taken in to consideration by policy makers in view of the fact that technology sector is a high value added sector that is affected much more intensely than other sectors by the change in interest and exchange rates. So policy makers should be aware of the potential affect of the policy changes on these parameters. The global factors that affect the global indices should also be taken in to consideration especially for the financial sector.

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